

# Digestible Organic Matter Index (DOMI)

Ranking Tool for Forages to Use in Place of Other  
Ranking Tools (such as RFV and RFQ)

# Marketing Strategies

How do You Market Your Hay?

Do you Use Forage Nutrient Analyses as a Tool to Price Hay?

What Nutrient Analyses do You Currently Use (CP, ADF, NDF, RFV, RFQ)?

What are the Benefits/Limitations of Using the Nutrient Analyses?

# Key Forage Evaluations for Marketing

Different approaches:

*rely on single nutrient*

*rely on multiple nutrients*

*combine multiple nutrients into an index*



# Key Forage Evaluations for Marketing

Requirements for a functional index:

*Simple*

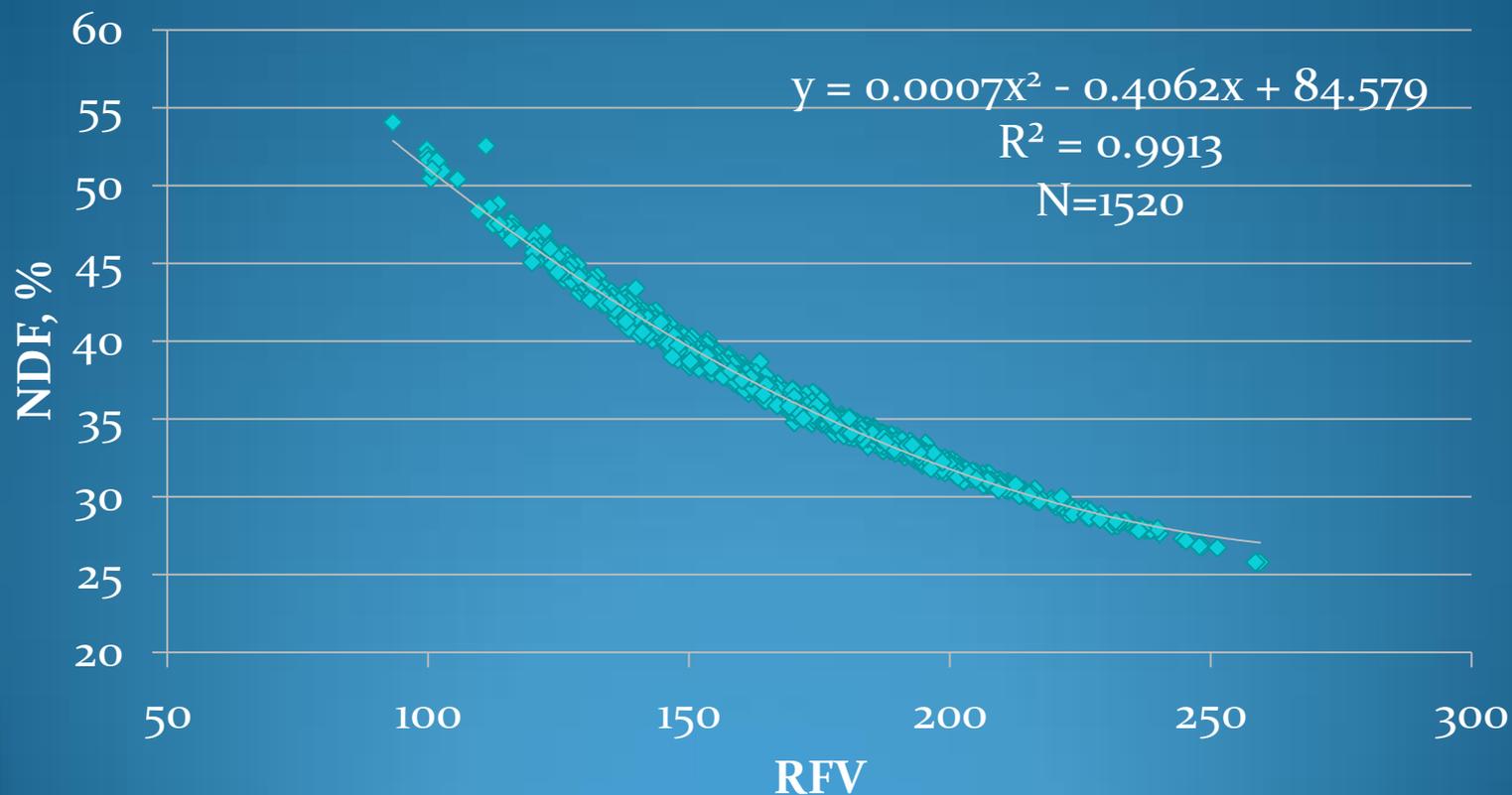
*Easy to understand and communicate*

*Nutritionally relevant*

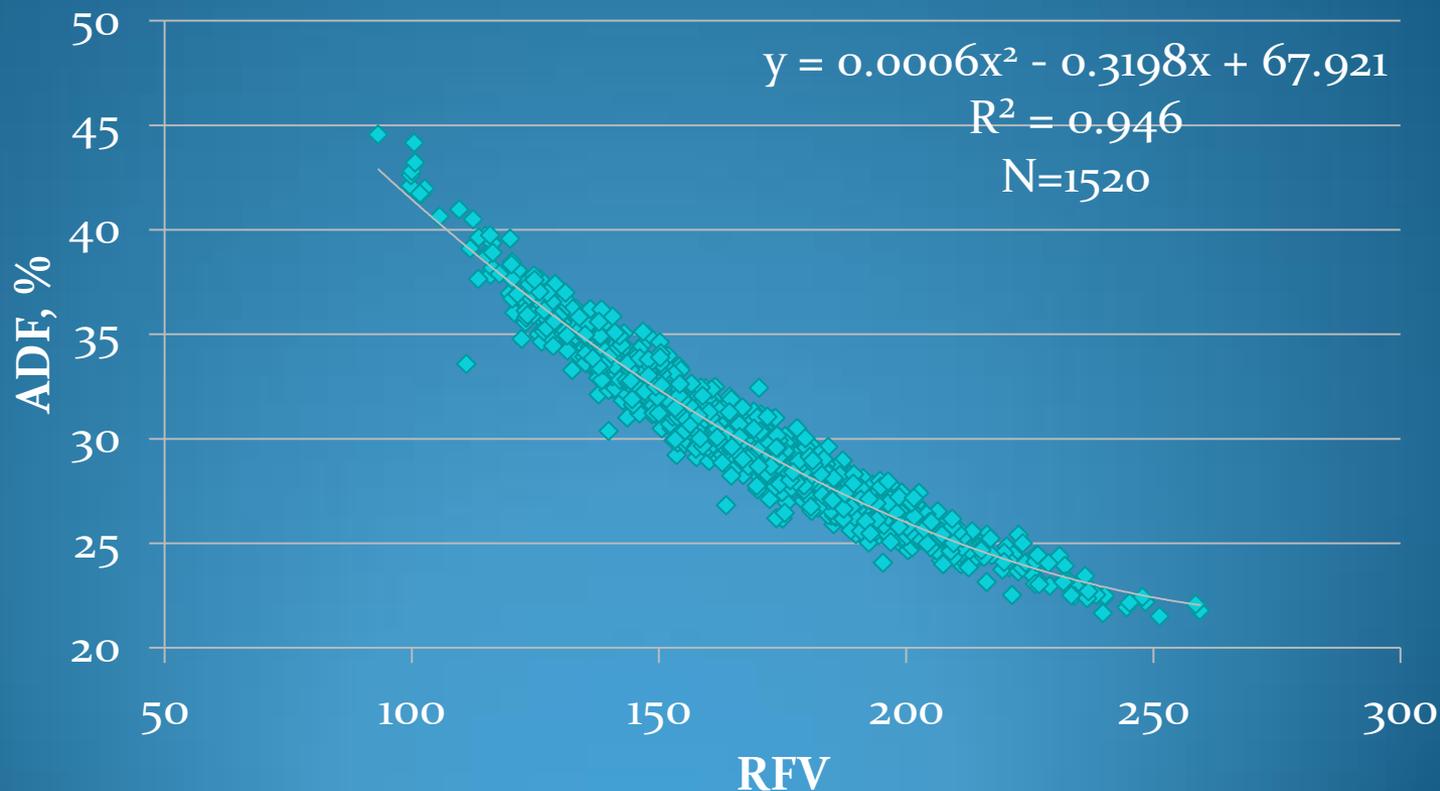
*Analysis: fast, low cost, high precision, repeatable  
across labs*



# Regression of Relative Feed Value on NDF



# Regression of Relative Feed Value on ADF



# RFQ Index

$$\text{RFQ} = (\text{DMI}_{\text{leg}}, \% \text{ of BW}) * (\text{TDN}_{\text{leg}}, \% \text{ of DM}) / 1.23$$

$$\text{DMI}_{\text{legume}} = 120/\text{NDF} + (\text{NDFD} - 45) * .374 / 1350 * 100$$

$$\text{TDN}_{\text{legume}} = (\text{NFC} * .98) + (\text{CP} * .93) + (\text{FA} * .97 * 2.25) + (\text{NDFn} * (\text{NDFD}/100) - 7)$$

Where:

CP = crude protein (% of DM)

EE = ether extract (% of DM)

FA = fatty acids (% of DM) = ether extract - 1

NDF = neutral detergent fiber (% of DM)

NDFCP = neutral detergent fiber crude protein

NDFn = nitrogen free NDF = NDF - NDFCP, else estimated as  $\text{NDFn} = \text{NDF} * .93$

NDFD = 48-hour in vitro NDF digestibility (% of NDF)

NFC = non fibrous carbohydrate (% of DM) =  $100 - (\text{NDFn} + \text{CP} + \text{EE} + \text{ash})$



# Key Point

When you purchase forage for feeding to ruminants, generally you are looking for forage that maximizes the amount of rumen fermentable organic matter and promotes high intakes of that fermentable organic matter.



# What is Digestible OM Index (DOMI)

Remove the Ash

Measure how much NDF disappears after 30 hours

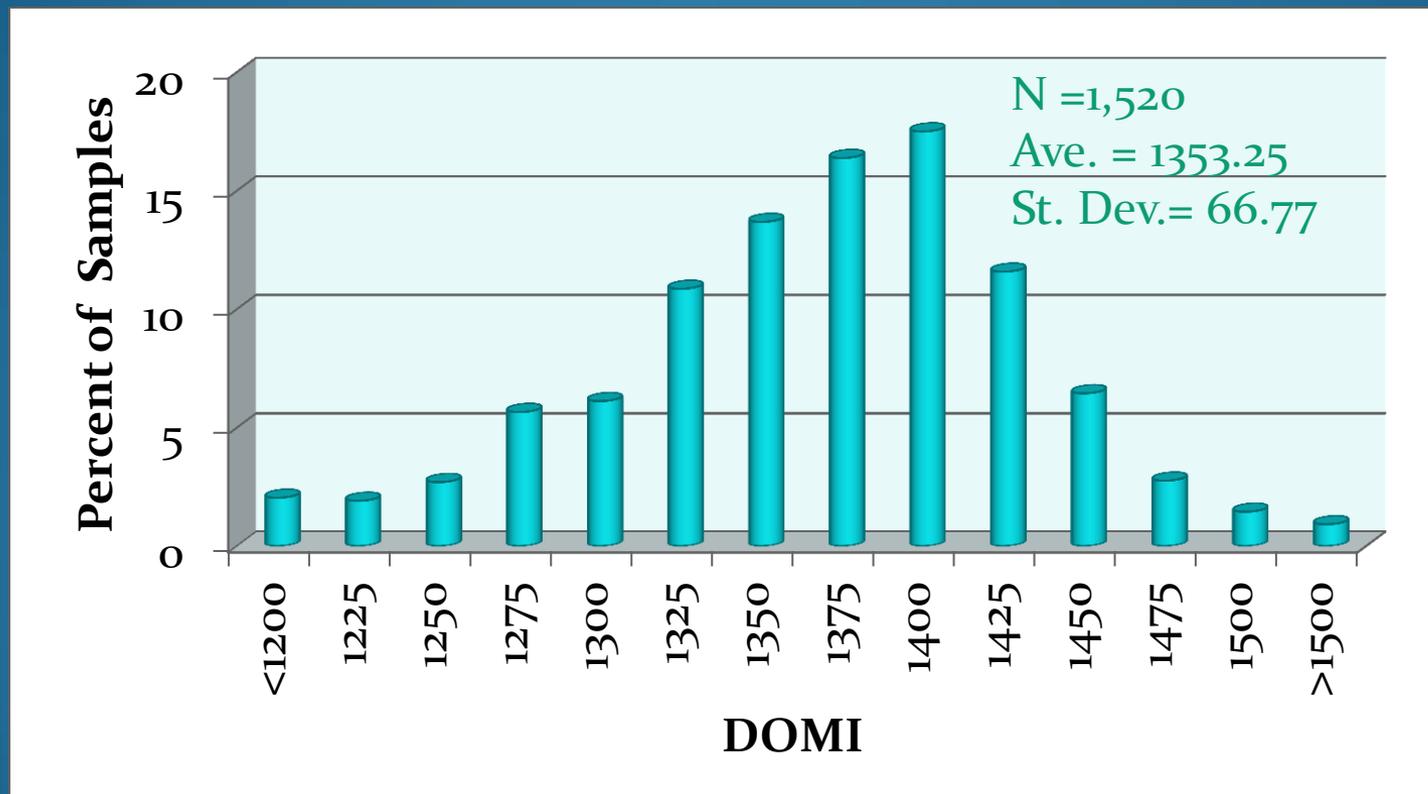
Report Pounds of Digestible OM in a Ton of Feed

# Nutrient Content of Legume Silage

Nutrient	Contribution	Digestible OM at 30 HRS
NDF (N free)	36 %	14 %
Soluble Fiber	11 %	11 %
Sugars	8 %	8 %
Starch	1 %	1 %
Organic Acids	4 %	4 %
Fermentation Acids	8 %	8 %
CP	21 %	19 %
Fat	2 %	
Ash	9 %	
Total	100 %	65 %



Figure 15. Distribution of Digestible Organic Matter Index, Western States Alfalfa Hay (Chemistry, CVAS 2011)



# Figure 16. Regression of Digestible Organic Matter Index on NDF (CVAS, 2011)

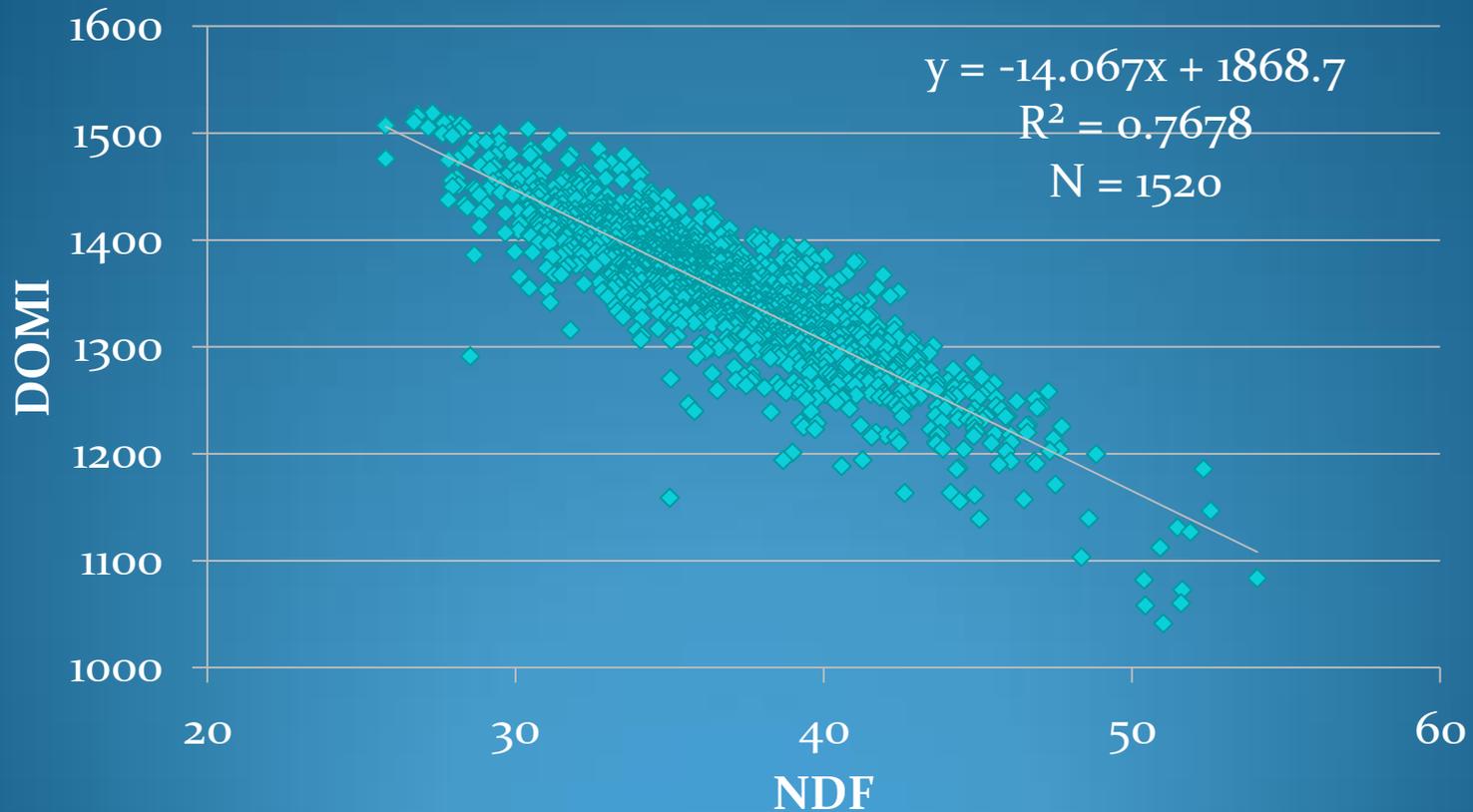
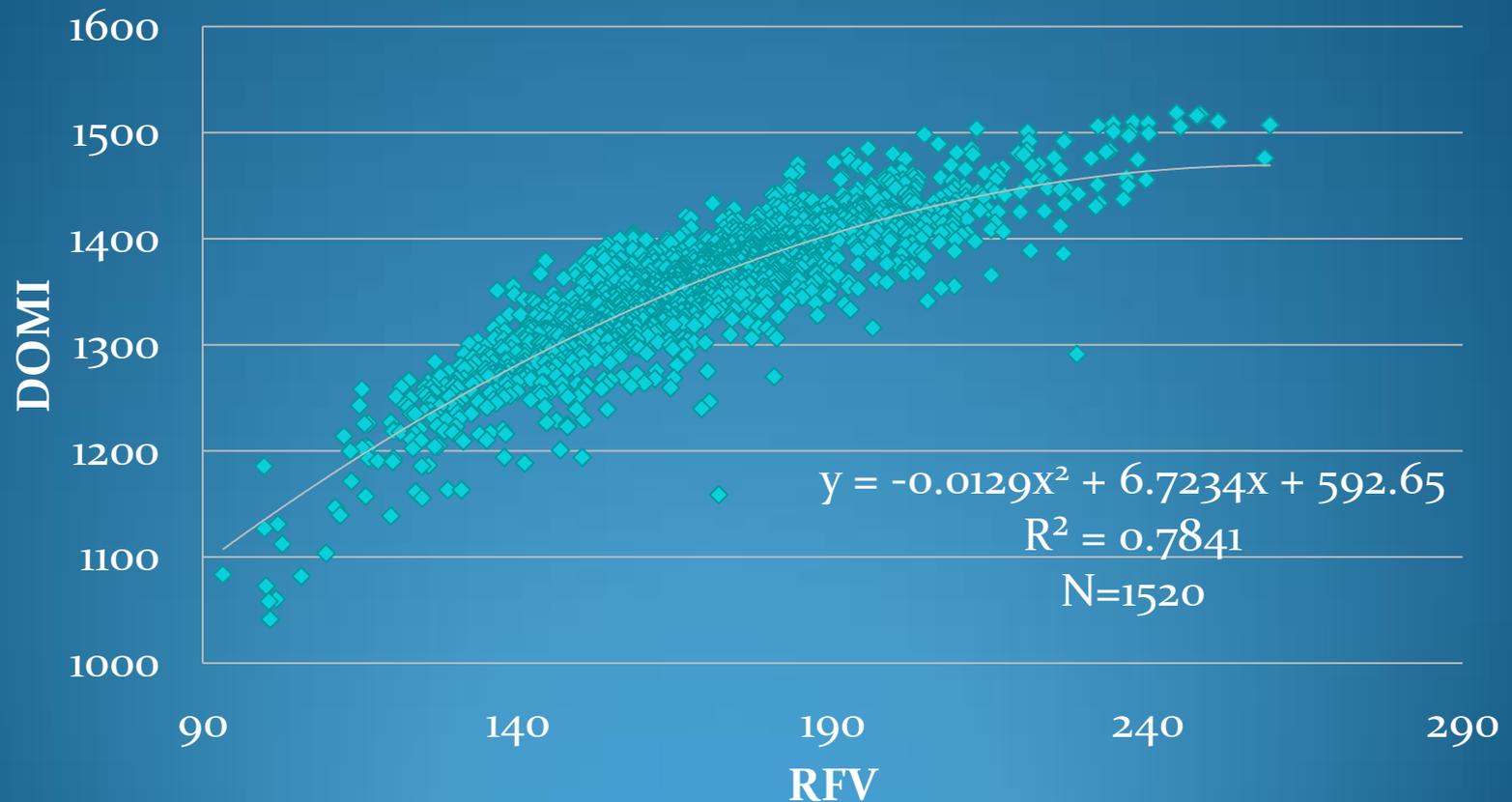


Figure 17. Regression of Digestible Organic Matter Index on Relative Feed Value (CVAS, 2011)



# Benefits of Using DOMI as a Ranking Tool for Forages

Many of the forages (particularly sudan, triticale, and some alfalfa forages) have substantial ash contamination (>15%) in the Western United States

Some ash is soluble in neutral detergent solution and will pass through the 1.5  $\mu\text{m}$  glass fiber filter paper that NDF is recovered on.

However, much of the ash is insoluble in ND solution and will be recovered on the filter paper and perceived as 'fiber'. This will elevate the NDF content in a forage.

A higher NDF value will lower the RFV value

# Benefits of Using DOMI as a Ranking Tool for Forages

The ash content of the forage is subtracted from the other digestible nutrients in the DOMI calculation.

The NDF portion of the forage sample undergoes an in vitro fermentation process, where the digestible portion of the NDF is determined. The digestible NDF is subtracted from the NDF content in the forage and the indigestible fraction of the NDF is estimated. The indigestible NDF fraction is also subtracted from the digestible nutrients in the DOMI calculation.

This ranking system is helpful where ash contamination may alter the results of traditional ranking systems, like RFV, that are based off fiber estimates that are not ash corrected.

# Benefits of Using DOMI as a Ranking Tool for Forages

RFV values increase linearly based on fiber levels. The lower the fiber the higher the RFV.

There has been discussion that hays with RFV values over 200 are many times overpriced because there is a point where the physically effective component of forages in the rumen is diminished because the hay becomes so fine that it is not as buoyant and does not form part of the rumen mat. Essentially it acts more like a concentrate than a forage.

# Benefits of Using DOMI as a Ranking Tool for Forages

The DOMI is curve linear. Essentially, it assigns more value to lower DOMI forages, and there is a point at the upper end of the curve where it assigns a similar value to forages.

It is also important to note the wide range in DOMI values at a given RFV concentration. Higher DOMI feed should be of much greater value and priced accordingly.

# Implementation Challenges

Not many labs provide invitro assays

Significant variation across labs in invitro analysis

Can be significant within lab variation in this assay



# Implementation Opportunities

Improving the hay evaluation process has great potential returns:

Better definition of quality through a nutritionally relevant index

Uniformity of information used for marketing

Reduction in buyer / seller conflicts

Reduction in number of samples taken

Increased confidence in information gained from testing

